

DEC 09 2010

Attorney Docket No. P70693US0  
Application No. 10/541,619**Amendments to the claims:**

This listing of claims replaces all prior versions, and listings, of claims in the application.

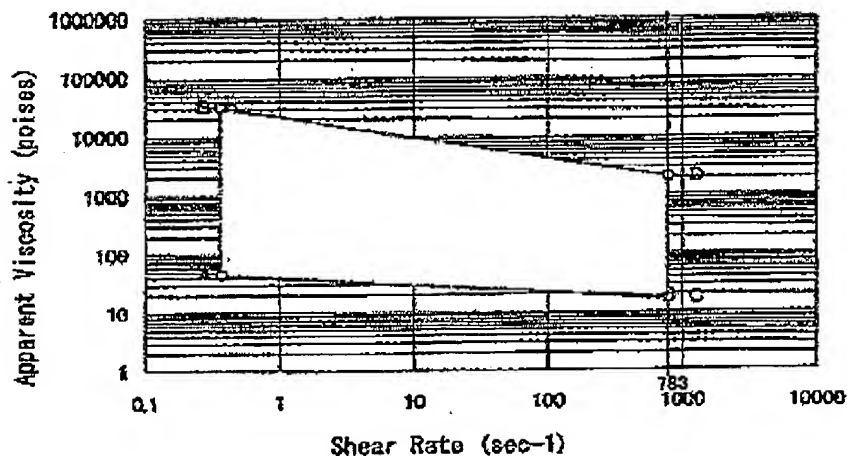
**Listing of claims:**

Claims 1-6 (cancelled).

7 (previously presented): A method of producing an expandable material using a piston pump having a cylinder and a piston adapted to reciprocally move within the cylinder to effect a suction stroke and a discharge stroke, the method comprising the steps of

- supplying a low-pressure gas of 0.1-5 kg/cm<sup>2</sup> to the cylinder under a predetermined pressure by effecting the suction stroke,
- supplying a paste material to the cylinder to mix with the low-pressure gas and produce a gas-mixed material, wherein the paste material is a one-pack-type curing paste material having viscosity characteristics included in a zone defined by points A, B, C and D in the graph

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showing the relationship between shear rate and apparent viscosity, the points A and B being at 50-30000 poises of an apparent viscosity (measured by a Brookfield rotary viscometer using spindle No.7, at 2 rpm, at 20° C) in low shear rate region (0.43 sec<sup>-1</sup>) and the points C and D being at 20-2000 poises of an apparent viscosity (measured by an apparent viscosity meter according to JIS K2220, at 20° C) in high shear rate region (783 sec<sup>-1</sup>), and

- discharging the gas-mixed material from the cylinder into a dispersing pipe, wherein the low-pressure gas disperses into the paste material to produce the expandable material.

8 (previously presented): The method of claim 7 further comprising the step of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material.

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9 (previously presented): The method of claim 7 further comprising the steps of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material and
- curing the foamed, curable material to produce a cured product.

10 (currently amended): A method of producing an expandable material using a mechanical foaming apparatus comprising

- a) a piston pump including a cylinder and a piston adapted to reciprocally move within the cylinder to effect a suction stroke and a discharge stroke,
- b) a gas supplying device for supplying a low-pressure gas of  $0.1\text{-}5\text{ kg/cm}^2$  into the cylinder under a predetermined pressure,
- c) a paste material supplying device for supplying a one-pack type curing paste material into the cylinder with the low-pressure gas under a predetermined pressure,
- d) a control device to control (i) the gas supplying device, (ii) the piston pump, (iii) the paste material supplying device, and (iv) the discharge device, for effecting control to supply the low-pressure gas into the cylinder during and/or after the suction stroke of the piston pump, supply the one-pack type curing paste material into the cylinder, effect the discharge stroke of the piston pump after the supplying stroke of the one-

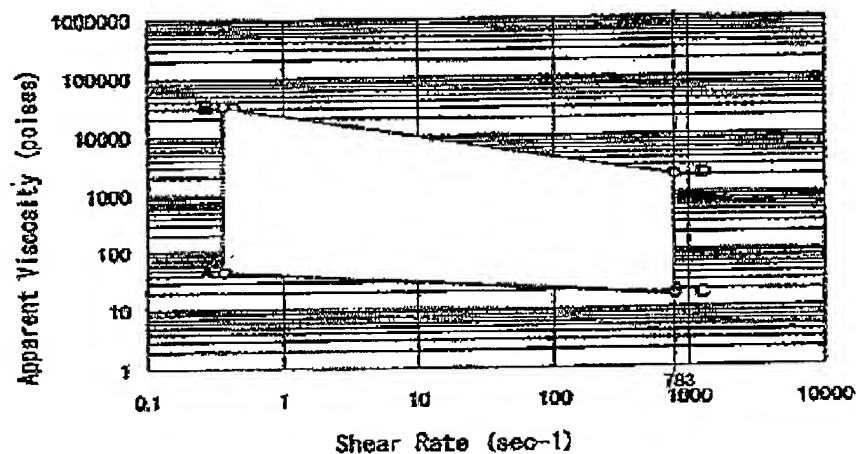
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pack type curing paste material, and discharge the low-pressure gas and the one-pack type curing paste material into a pipe, and

e) a discharge device for discharging and expanding the one-pack type curing paste material with the low-pressure gas from the piston pump into a dispersing pipe,

the method comprising, under control of the control device, the steps of

- supplying the low-pressure gas of  $0.1\text{--}5\text{ kg/cm}^2$  to the cylinder under a predetermined pressure by effecting the suction stroke,
- supplying the one-pack-type curing paste material to the cylinder to mix with the low-pressure gas and produce a gas-mixed material, the one-pack-type curing paste material having viscosity characteristics included in a zone defined by points A, B, C and D in the graph



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showing the relationship between shear rate and apparent viscosity, the points A and B being at 50-30000 poises of an apparent viscosity (measured by a Brookfield rotary viscometer using spindle No.7, at 2 rpm, at 20° C) in low shear rate region ( $0.43 \text{ sec}^{-1}$ ) and the points C and D being at 20-2000 poises of an apparent viscosity (measured by an apparent viscosity meter according to JIS K2220, at 20° C) in high shear rate region ( $783 \text{ sec}^{-1}$ ).

- discharging the gas-mixed material from the cylinder into the dispersing pipe, wherein the low-pressure gas disperses into the paste material to produce the expandable material.

11 (previously presented): The method of claim 10 further comprising the step of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material.

12 (previously presented): The method of claim 10 further comprising the steps of

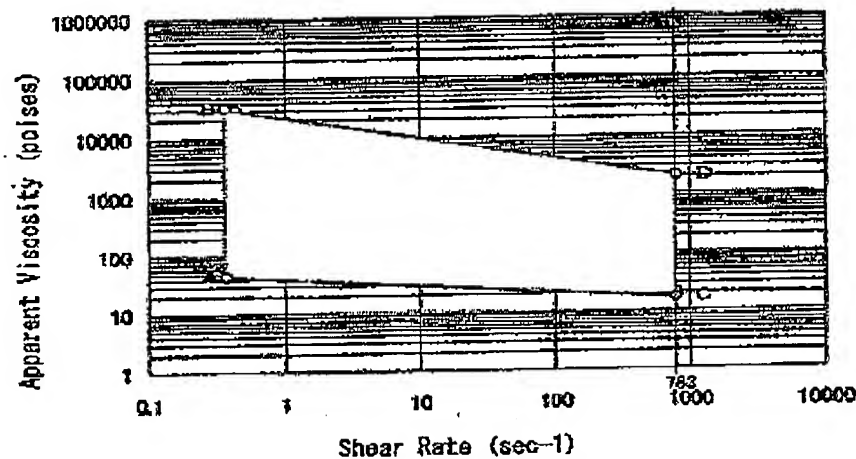
- discharging the expandable material from the dispersing pipe to produce a foamed, curable material and
- curing the foamed, curable material to produce a cured product.

13 (previously presented): The method of claim 10 further comprising the steps of

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- discharging the expandable material from the dispersing pipe to produce a foamed, curable material adapted for an article selected from the group consisting of a sealant, a coating material, a gasket, a packing, a cushion, an insulator, and a foamed molded material and
- curing the foamed, curable material to produce a cured product.

14 (currently amended): A one-pack-type curing paste material having viscosity characteristics included in a zone defined by points A, B, C and D in the graph



showing the relationship between shear rate and apparent viscosity, the points A and B being at 50-30000 poises of an apparent viscosity (measured by a Brookfield rotary viscometer using spindle No.7, at 2 rpm, at 20° C) in low shear rate region (0.43 sec<sup>-1</sup>) and the points C and D being at 20-2000 poises of an apparent viscosity (measured by an

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apparent viscosity meter according to JIS K2220, at 20° C) in high shear rate region (783 sec<sup>-1</sup>).

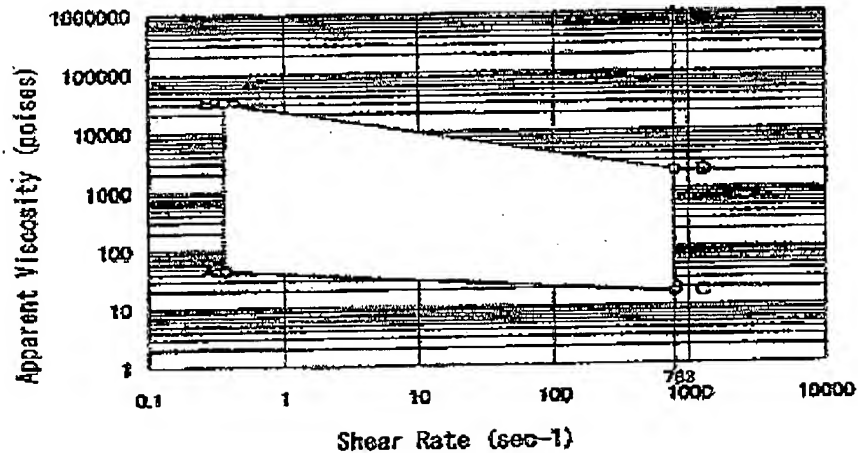
15 (previously presented): The one-pack-type curing paste material according to claim 14 selected from the group consisting of a moisture-curable one-pack-type curing paste material, a thermosetting one-pack-type curing paste material, a sol-gel one-pack-type curing paste material, a vulcanization-crosslinking one-pack-type curing paste material, and a photo/radiation-curable one-pack-type curing paste material.

16 (previously presented): The one-pack-type curing paste material according to claim 14 comprising a material selected from the group consisting of a silicone, a polyurethane, an epoxy, a synthetic rubber, a polyolefin, a polyester, an acrylic resin, a thermoplastic, and a thermoplastic elastomer.

Claims 17-26 (cancelled).

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27 (new): A one-pack-type curing paste material having an apparent viscosity in relation to shear rate within a zone defined by points A, B, C, and D in the graph



wherein apparent viscosity is 50-30000 poises, the points A and B, in the region of low shear rate, measured at  $0.43 \text{ sec}^{-1}$ , and apparent viscosity is 20-2000 poises, the points C and D, in the region of high shear rate, measured at  $783 \text{ sec}^{-1}$ , apparent viscosity in the region of low shear rate being measured at  $20^{\circ}\text{C}$  by Brookfield rotary viscometer using spindle No.7 at 2 rpm, and apparent viscosity in the region of high shear rate being measured at  $20^{\circ}\text{C}$  according to JIS K2220.



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28 (new): The one-pack-type curing paste material according to claim 27 selected from the group consisting of a moisture-curable one-pack-type curing paste material, a thermosetting one-pack-type curing paste material, a sol-gel one-pack-type curing paste material, a vulcanization-crosslinking one-pack-type curing paste material, and a photo/radiation-curable one-pack-type curing paste material.

29 (new): The one-pack-type curing paste material according to claim 27 comprising a material selected from the group consisting of a silicone, a polyurethane, an epoxy, a synthetic rubber, a polyolefin, a polyester, an acrylic resin, a thermoplastic, and a thermoplastic elastomer.

30 (new): A method of producing an expandable material using a piston pump having a cylinder and a piston adapted to reciprocally move within the cylinder to effect a suction stroke and a discharge stroke, the method comprising the steps of

- supplying a low-pressure gas of  $0.1\text{-}5\text{ kg/cm}^2$  to the cylinder under a predetermined pressure by effecting the suction stroke,
- supplying a paste material to the cylinder to mix with the low-pressure gas and produce a gas-mixed material, wherein the paste material is the one-pack-type curing paste material of claim 27, and

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- discharging the gas-mixed material from the cylinder into a dispersing pipe, wherein the low-pressure gas disperses into the paste material to produce the expandable material.

31 (new): The method of claim 30 further comprising the step of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material.

32 (new): The method of claim 30 further comprising the step of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material and
- curing the foamed, curable material to produce a cured product.

33 (new): A method of producing an expandable material using a mechanical foaming apparatus comprising

- a) a piston pump including a cylinder and a piston adapted to reciprocally move within the cylinder to effect a suction stroke and a discharge stroke,
- b) a gas supplying device for supplying a low-pressure gas of 0.1-5 kg/cm<sup>2</sup> into the cylinder under a predetermined pressure,

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- c) a paste material supplying device for supplying the one-pack type curing paste material of claim 27 into the cylinder with the low-pressure gas under a predetermined pressure,
  - d) a control device to control (i) the gas supplying device, (ii) the piston pump, (iii) the paste material supplying device, and (iv) the discharge device, for effecting control to supply the low-pressure gas into the cylinder during and/or after the suction stroke of the piston pump, supply the one-pack type curing paste material into the cylinder, effect the discharge stroke of the piston pump after the supplying stroke of the one-pack type curing paste material, and discharge the low-pressure gas and the one-pack type curing paste material into a pipe, and
  - e) a discharge device for discharging and expanding the one-pack type curing paste material with the low-pressure gas from the piston pump into a dispersing pipe,
- the method comprising, under control of the control device, the steps of
- supplying the low-pressure gas of  $0.1\text{-}5\text{ kg/cm}^2$  to the cylinder under a predetermined pressure by effecting the suction stroke,
  - supplying the one-pack-type curing paste material to the cylinder to mix with the low-pressure gas and produce a gas-mixed material, and
  - discharging the gas-mixed material from the cylinder into the dispersing pipe, wherein the low-pressure gas disperses into the paste material to produce the expandable material.

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34 (new): The method of claim 33 further comprising the step of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material.

35 (new): The method of claim 33 further comprising the steps of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material and
- curing the foamed, curable material to produce a cured product.

36 (new): The method of claim 33 further comprising the steps of

- discharging the expandable material from the dispersing pipe to produce a foamed, curable material adapted for an article selected from the group consisting of a sealant, a coating material, a gasket, a packing, a cushion, an insulator, and a foamed molded material and
- curing the foamed, curable material to produce a cured product.